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AN

ESSAY

CONCERNING

BLOOD-LETTING.

SHEWING THE

VARIOUS EFFECTS

AND

Peculiar Advantages

OF

BLEEDING in different Parts of the HUMAN BODY,

Particularly in the FOOT,

WITH

Proper Directions how to make ſuch a CHOICE, as will beſt anſwer the End, in all the Variety of CASES whatever.

Opinionum Commenta delet Dies, Veritatis Judicia confirmat. CIC.

By R. BUTLER, M. D.

LONDON:

Printed for W. MEARS, at the *Lamb* on *Ludgate-Hill.* M.DCC.XXXIV.

[Price 2 *s.* 6 *d.*]

TO THE

Right Honourable

The LORD

Charles Noel Somerset,

THIS

ESSAY

(As a publick Testimony of the highest Gratitude and Respect)

Is most humbly dedicated.

BY

His LORDSHIP'*s*

Most Obliged, and

Most Obedient Servant,

RICHARD BUTLER.

The PREFACE.

THE Design of the following Sheets, is not to instruct the LEARNED *in* Physick, *but to shew those of a lower Class, that it is not, in all Cases, indifferent from what Part of the Body Blood is taken; and, after that, to recommend to them Bleeding in the Foot, in Fevers, and in several other Disorders particularly specify'd in this* ESSAY. *Of the good Effects from this Practice, not to mention the great Encomiums given it by Physicians of undoubted Credit and Veracity abroad, I have so frequently*

been

been an Eye-Witness in Italy, France, *and* England, *that for the Benefit of Mankind, I think myself obliged to declare it to the World.*

Dr. SILVA, *a very Learned and Ingenious Physician at* Paris, *wrote some Years ago at large upon this Subject; that Work, the first Edition of which was printed in two Volumes in* Octavo, *is intitled,* Traité de l'Usage des differentes sortes de Saignées, principalement de celle du Pied; *from thence I have taken what I thought most for my Purpose; and thither I refer, for farther Satisfaction, all such who are not convinc'd by what is said in this short* ESSAY.

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CHAP.

A N

AN ESSAY CONCERNING *BLOOD-LETTING.*

CHAP. I.

A general View of the Blood, of its Quantity, Circulation, and different Velocity of its Motion.

THE Blood is a warm Red Liquor, which, by Means of its proper Vessels, circulates through every Part of the Body. While it continues in Motion, it ap-

pears to be *homogeneous*, or uniform: But if view'd with a *Microſcope*, ſeems to be a Number of little red Globules, floating in a watery Fluid. And when it is let out of its Veſſels, and grows cold, it ſeparates of its own Accord into two Subſtances of a very different Kind, *viz.* a red fibrous Part, or *Craſſamentum*, and a watery Part, or *Serum*. It is not neceſſary to my preſent Purpoſe, to enquire into its conſtituent Principles, to give a chymical *Analyſis* of it, or to aſſign any Reaſon either for its Heat or Colour: I ſhall only conſider it at preſent as a Fluid driven through Pipes, after the ſame Manner, and by the ſame Laws that other Fluids are. For an animal or human Body, may be very properly compar'd to an *Hydraulic* Engine: The Arteries and Veins are its Tubes or Pipes; the Blood is the Fluid, that like Water is propell'd through them; and the

Heart

Heart is the *Piston*, or Furcer. There is indeed this Difference between 'em, that whereas Water is driven or expell'd out of those Machines, through Pipes that are so firm and strong, as not to be distended by it in its Passage; in an human Body the vital Fluid is only forced circularly round through Canals that are yielding and *elastic*.

'Tis very difficult, if not impossible, to determine the exact Quantity of Blood in an human Body, even though we should suppose no Difference at all to arise from the different Size and Magnitude of Bodies: It has been generally thought not to exceed four or five and twenty Pounds, though of late it has been affirmed by some to be at least three Times as much. But in that Case, all the Juices of the Body, the various Humours that are separated from the Blood, as well as the Blood itself, must be brought into the Computation.

 That

That the Motion of the Blood is owing to that of the Heart, and the contractile Power of the Arteries, is, I believe, universally allow'd; but as to the Cause of the Heart's Motion, whether we ascribe it to the Influx of the animal Spirits, or to the Accension and Dilatation of the Blood in its Ventricles, or to both in Conjunction, such insuperable Difficulties arise, as make it impossible to give a satisfactory Account of it. This however we know, and are sure of, that since the Heart is a Muscle, its proper Motion must be Contraction; and that its *Diastole* is only a Ceasing or Restitution from that Motion. During this *Diastole* the Fibres of the Heart are relax'd, and the Blood that comes from the *Vena Cava* flows out of the Auricles into the Ventricles; and as soon as the Ventricles are sufficiently fill'd. and distended thereby, all the Fibres of the Heart begin

gin to contract themſelves; by which Means its *Apex*, or Cone, being drawn towards its *Baſis*, and the Sides of its Ventricles conſtring'd and ſtraiten'd, their Cavities muſt be every Way ſhorten'd and leſſen'd, and conſequently the Blood muſt be expell'd out of them with great Force into the Arteries; which Motion is called the *Syſtole*. Now this *Syſtole*, or Contraction of the Heart muſt needs cauſe a Pulſation of the Arteries all over the Body; for what we call the Pulſe, is nothing but a Diſtention, or Dilatation of the Sides of the Arteries, occaſion'd by the repeated *Impetus* of the Blood that is thrown into them in every Contraction of the Heart. And, ſince it is evident that in every *Diaſtole* of the Heart, there is an Influx of Blood into it from the *Cava*, and in every *Syſtole* as conſtant an Expulſion of it into the *Aorta*; and that the Supply from the

Veins

Veins is never exhausted, nor its Course through the Arteries ever obstructed; it necessarily follows that its Motion must be circular, that is, that the Blood which is continually driven out of the left Ventricle of the Heart into the great Artery, is carried on through a Continuation of Arteries to all, even the most extreme Parts of the Body; where it is received by the *capillary* Veins, which transmit it back through a Series of Veins, which grow larger as they approach nearer to the Heart, till at length it arrive in the *Vena Cava*, the largest of them all, which pours it into the right Ventricle; from whence it is expell'd through the *pulmonary* Artery into the Lungs, where it is receiv'd by the *pulmonary* Vein, and so conducted back again into the left Ventricle of the Heart, from whence we began its Circulation.

It

It cannot be imagin'd, that every Part of the whole Maſs of Blood ſhould perform this circular Tour in the ſame Space of Time: That Portion of it which is carried to ſuch Parts of the Body as are neareſt to the Heart, muſt needs return ſooneſt back, and ſo of the whole, in Proportion to the Diſtance to which it is carried. That Part of it, therefore, which marches no farther than the *Œſophagus*, the *Pleura*, or the *Diaphragm*, will paſs ſeveral Times through the Heart, while that which paſſes through the *capillary* Arteries and Veins of the Feet and Toes, performs only one Circulation. But though it be impoſſible to aſcertain and ſpecify any particular Space of Time, in which the entire Maſs of Blood paſſes through the Heart, yet a pretty near Gueſs may be made how great a Quantity conſtantly does, by conſidering the Capacity of

its

its Ventricles, and the Frequency of its *Systoles*, or Contractions. The least of its Ventricles is known by such as have been conversant in Dissections, to be capable of containing about two Ounces of Blood; now in every *Diastole* they are both very nigh fill'd, and in every *Systole* very nigh, if not intirely emptied, by the strong Constriction of its Fibres. The Heart contracts about seventy Times every Minute, that is, four thousand two hundred Times in an Hour, more or less, according to the Difference of Ages, Sexes, or Constitutions: If therefore we allow an Ounce and quarter of Blood to be expell'd into the *Aorta* by every *Systole* or Contraction of the Heart, which is a very reasonable Computation, since each Ventricle is capable of containing two, there must pass through it every Minute above eighty seven Ounces, or seven Pounds of Blood,

Blood, and consequently five thousand two hundred and fifty Ounces, which is more than four hundred and thirty-two Pounds in an Hour.

As to the different Degrees of Velocity, wherewith the Blood moves through the Arteries, from the left Ventricle of the Heart to the extreme Parts of the Body, and from thence back again through the Veins to the right Ventricle, it may in general be affirmed, That the nearer it is to the Heart, the swifter its Motion is; and consequently the farther it is from thence, the more slowly it moves. This, however, may admit of some Variation, according to the different Compression of the Vessels in different Parts of the Body; according likewise to the Position of them, whether direct or oblique, and according to their Division into more or fewer Branches.

From what Cause soever it be that the Blood meets with a less or greater Resistance in its Circulation, its Velocity will either be increased or diminished. The Blood moves with the greatest Velocity at its Entrance out of the left Ventricle of the Heart into the Trunk of the *Aorta*, and with the least of all in the *capillary* Arteries: It moves less swiftly in the *Vena Cava*, than in the great Artery; but more swiftly in the *capillary* Veins, than in the *capillary* Arteries. But notwithstanding this Variety and Difference of the Blood's Velocity in different Parts of the Body, yet upon the whole, its Circulation is equable and uniform, that is to say, just so much Blood as is thrown out of the left Ventricle of the Heart into the Trunk of the *Aorta*, in any given Space of Time, just so much is

emitted

emitted out of all the *capillary* Arteries of the Body into the Veins that are continued to them: And just so much as is received by all the *capillary* Veins from those Arteries, just so much is discharged by the *Vena Cava* into the right Auricle of the Heart, in the same Space of Time. So that the Blood moves in as little Time from the Origin of the *capillary* Veins to the right Ventricle of the Heart, as from the left Ventricle to the Extremity of the *capillary* Arteries. The chief Difference seems to be this; That in the first Case the Blood moves slowest at the Beginning, and its Velocity increases as it approaches nearer to the Heart: Whereas in the latter it moves fastest at the Beginning near the Heart, and its Velocity diminishes as it comes nearer to the extreme Parts of the Body. Without such

an Uniformity of Circulation as this, Life could not be long preſerv'd; for if in the Arteries, the Blood which follows after ſhould move faſter on than that which goes before can make way for it, it muſt needs be accumulated, and the Veſſels be in danger of being burſt aſunder; upon which Death muſt neceſſarily enſue: Or if in the Veins the Blood which goes before ſhould move ſo faſt, that what follows could not keep pace with it, there muſt happen an *Hiatus*, or Chaſm, in the Circulation; which would be attended with Conſequences equally fatal.

From hence, therefore, it neceſſarily follows, that the Velocity of the Blood's Motion, at its Entrance into the *Aorta*, is to that with which it moves in the *capillary* Arteries, in a reciprocal Proportion to the Orifices through which it moves, that is

to

to ſay, as the Sum total of the Orifices of all the *capillary* Branches of the *Aorta* is to the Trunk of that Artery; and its Velocity at the Origin of the *capillary* Veins, is, with Reſpect to that with which it moves in the *Vena Cava*, as the Orifice of the Trunk of that Vein is to the Sum total of the Orifices of the *capillary* Veins.

The Truth of both theſe Propoſitions appears from the Laws of *Hydroſtaticks*, and is demonſtrated thereby; for it would be impoſſible that the Quantity of Blood, which flows in an equal Space of Time through the Trunk of the *Aorta* and the *capillary* Arteries, or through the Trunk of the *Cava* and the *capillary* Veins, ſhould be equal, unleſs the Inequality of its Velocity were exactly made up by the Inequality of the

Orifices

Orifices of the Vessels through which it flows.

I believe it will very readily be granted, that there is a vast Disproportion between the Sum total of the Orifices of all the *capillary* Arteries taken together, and the Trunk of the *Aorta*, as well as between the Orifices of all the *capillary* Veins and the *Vena Cava*; since the first Division both of that Artery and Vein is known to be greater than the Trunks themselves, and that Disproportion still goes on increasing at every Division, till at last they terminate in *Capillaries*, which compose the greatest Part of the Surface of the Body. What this Disproportion is, cannot be exactly determin'd; but if we have a Mind to indulge a Liberty of guessing, we may venture to affirm, that the Difference is at least

four

four or five hundred, and consequently that the Blood moves four or five hundred Times faster in the Trunk of the *Aorta*, than at the Extremity of the *capillary* Arteries. And this will likewise hold true, if the Difference be the same between the Velocity of its Motion in the *Cava*, and at the Origin of the *capillary* Veins.

CHAP.

CHAP. II.

An Account of the Vessels through which the Blood circulates, more particularly of the AORTA, *or great Artery, and of its principal* RAMIFICATIONS *or Branches.*

ALL the Vessels, wherein the Blood is contain'd, and through which it moves all over the Body, are either Arteries or Veins. Both of them are of the same Figure, that is, neither exactly conical nor cylindrical; and they are compos'd of the same Number of Tunicles, or Coats, though those of the Arteries are thicker and stronger. Some reckon the

the Veins to be only a Continuation of the *capillary* Arteries; but we shall consider them both at present, as taking their Rise from the Heart. The *Vena Cava*, which is, as it were, the Source and Origin of all the Veins, as well as the largest of them, and into which the rest discharge themselves at last, is continued to, and opens into the right Auricle of the Heart. At a little Distance from thence, it is divided into two large Branches, the ascending and descending: The former of which receives the Blood from all the Parts above; and the latter, from all those below the Heart. Those Branches are divided, and subdivided; and so continued through various Subdivisions, still growing less, as they approach the extreme Parts, till at length they terminate there in *Capillaries*, which receive the Blood that

 is

is brought thither by the *capillary* Arteries.

As to the Way or Manner how the Blood passes out of the Arteries into the Veins, 'tis certain that the former frequently open into, or are continued to the latter by *Inosculation*; but besides that, there are likewise very fine Sprigs of the *capillary* Arteries, that discharge Blood every where into the Pores and Substance of the Body, some of which is spent upon the Nutrition of the several Parts, and the Remainder imbibed by the gaping Mouths of the *capillary* Veins. Without this, 'tis impossible to conceive how the several Parts of the Body could be nourished; for the Blood, while it remains within its Vessels, though it may impart Warmth, can give no Nourishment at all to them, since even the Vessels themselves are not nourished

nourished by the Blood that flows through their Cavities, but by numberless *Capillaries* that are every where dispersed through their Coats.

The Position of all the Veins and Arteries in the Body, is the same, with respect to the Heart, that is to say, supposing them to be Cones, or conical Tubes, the *Basis* or Bottom is always towards the Heart, and the *Apex*, or Point, towards the extreme Parts: So that the Blood, in its Circulation through the Veins, always flows from the narrower towards the wider End of its containing Vessel; though, if we consider the whole Extent it possesses within the Veins, it may, upon the whole, be said to flow from a larger into a less Space, since the Capacity of the Orifices of all the *capillary* Veins taken together, is much greater than the Trunk of the *Vena Cava*. On

the contrary, the Blood, in its Circulation from the Heart towards the extreme Parts, always flows from the wider towards the narrower End of its containing Canal; and yet in general may be ſaid to paſs from a leſs into a larger Space, becauſe the Orifice of the *Aorta* is ſome hundreds of Times leſs than the Sum of all the Orifices of the *capillary* Arteries, which compoſe a great Part of the Surface of the Body.

It has been generally thought, that the Bulk or Capacity of all the Arteries in the Body, was greater than that of the Veins; and the Blood being a Fluid capable of Rarefaction and Compreſſion, was ſuppoſed to have been rarefied in the Ventricles of the Heart; and conſequently, to have required a greater Space to contain it: But Mr. *Helvetius* has eſpouſed the contrary Opinion, maintaining,

ing, that the Veins are much more considerable than the Arteries; and that the Blood is so far from being rarefied, that it is compress'd and condens'd by the Action of the Heart.

I shall not enter into this Dispute at present, but rather proceed to give an Account of the Origin, Situation, and Division of the principal Branches of the *Aorta*; a right Understanding of which will be of great Use, to illustrate and confirm the Truth of several Particulars in the subsequent Parts of this *Essay*.

'Tis well known that from each Ventricle of the Heart there arises an Artery; from the *right* springs the pulmonary Artery, which distributes the Blood all over the Lungs; and from the *left*, the *Aorta*, or great Artery, which it is our Business to consider more particulary at present.

present. This Artery, not to mention the *Coronaries*, which it sends to the Heart before it pierces the *Pericardium*, does not ascend in a direct Course towards the Head, but a little obliquely from the Right to the Left, and then bends a little back again towards the Right, by which Means it describes a kind of Semicircle, or Arch; after which it continues its Course downwards through the *Thorax* into the *Abdomen*. From the upper Part of this Arch, or Bend, it sends out three considerable Branches, which altogether make up what is commonly called the *Aorta ascendens*, though each of them has its particular Name. That on the Right is call'd the right *subclavian* Artery; that in the Middle, the left *Carotid*; and that on the Left, the left *subclavian* Artery. As to the right *carotid* Artery, it is to be observ'd, that

that it ſeldom takes its Riſe from the Bend of the *Aorta*, as the three forementioned Branches do, but generally from the right *ſubclavian*, a little above the ſaid Arch, or Bend. From the upper Side of the *Subclavians* ariſe two conſiderable Arteries, called the *Vertebrals*, which together with the *Carotids*, and the ſeveral *Ramifications* of 'em, convey Blood both to the internal and external Parts of the Head. The *Subclavians* likewiſe ſend out ſeveral other Branches, as the *Intercoſtalis ſuperior*, the *Mammariæ*, the *Thoracica ſuperior* and *inferior*, &c. After which, paſſing out of the Breaſt, they are called *Axillary*; and proceeding further in the Arms, they are called *Brachial*; and being arrived at the Bending of the Arm, they are divided into two, the one called the *Cubital*, and the other the *Radial*; by the Branches

of

of which, all the Parts of the Fore-Arm and Hand are supplied with Blood.

'Tis no Part of my present Design, or in the least necessary to it, to give an exact and minute Account of the several Divisions and Ramifications of these Arteries; all I propose to do, is only to shew in general, that by the *carotid* and *subclavian* Arteries, which make what is commonly called the *Aorta ascendens*, and the several Branches that arise from them, Blood is convey'd from the Heart to the Face, Head, Neck, Shoulders, Arms, upper Part of the Breast, and generally to all the superior Parts of the Body as low as the fourth Rib. The two *Subclavians* are so situated, that the *Right*, rising higher, goes more directly towards the right Arm; whereas, the *Left*, not rising so high,

high, marches more obliquely towards the left Arm: But the Position of this latter, with respect to the Heart, is such, that the whole Torrent of Blood is thrown chiefly into it, some Part of its *Impetus* being however received by the descending Trunk of the *Aorta*, and the left *Carotid*; so that the right *Subclavian* seems to receive very little or no Blood at all, till after it has been reverberated back, and quite lost that Direction of its Motion that was at first impress'd on it by the Heart.

As to the Orifices of the principal Branches of the *Aorta*, both the *Carotids* are less than the *Subclavians*, the right *Carotid* is larger than the left *Carotid*, and the same is true of the *Subclavians*; but the descending Trunk of the great Artery is double all the ascending Branches, that is to

ſay, both the *Subclavians* and the left *Carotid* put together.

The firſt Branches the *Aorta deſcendens* ſends out from its hinder Side, are the *Bronchial* and inferior *Intercoſtal* Arteries; the former to the *Bronchi* of the Lungs, and the latter to the Interſtices of the eight lower Ribs. But here we are to obſerve, that the Origin of the *Bronchial* Artery is very uncertain, it ſometimes ariſing immediately from hence, and at other times from the ſuperior *Intercoſtal* Artery; as likewiſe, that the four upper Ribs, and the *Œſophagus*, often receive ſmall Branches from this Trunk of the great Artery. This Trunk afterwards deſcending lower, and paſſing through the two Appendixes or Tendons of the Diaphragm, ſends Branches to it called *Phrenicæ*; and as ſoon as ever it enters the lower Belly, it

ſends

ſends out from its fore Part a ſhort, but very conſiderable Branch, called the *Truncus Cœliacus*; which being divided into three Branches, one of 'em goes to the Stomach, another to the Spleen, and the third to the Liver. Below the *Truncus Cœliacus* ariſe the *Meſenteric* Arteries, which carry Blood to the Meſentery and Inteſtines; then the *Emulgents* which go to the Kidneys, and after them the *Spermaticæ* and *Lombares*. After this Trunk of the *Aorta* has deſcended about as low as the laſt *Vertebra* of the Loins, it is divided into two equal Branches, called *Rami Iliaci*, or the *Iliac* Arteries: Theſe are again ſubdivided into the external and internal Branches, both which ſend out other leſs Branches; by which all the neighbouring Parts are ſupply'd with Blood: After this, the external Branches deſcending ſtill lower into

the Thighs, receive the Name of *Crural.* These *crural* Arteries, before they reach the Ham, send forth three Branches, which convey Blood to the neighbouring Muscles; and, when they are past it, send out the like Number, which are dispers'd through the several Parts of the Leg and Foot, and at last terminate in *Capillaries* there.

This, though it be very far from a full and perfect Account of all the various Subdivisions and minute Ramifications of the several Parts of the great Artery, yet is sufficient to my present Purpose; which was only to give a clear and distinct Idea of its principal Division into the *Aorta Ascendens* and *Descendens*, and of the chief Branches arising from both; and, at the same Time, to shew that the whole Body, and all its Parts, both external and internal, from the

fourth

fourth Rib downwards, are generally ſupply'd from the deſcending Trunk of the *Aorta*, or ſome Branch that ariſes from it. As to thoſe few Parts that receive Blood from ſmall Arteries, which take their Riſe from the ſuperior, as well as inferior Trunk, they ſhall be particularly taken notice of hereafter.

CHAP.

CHAP. III.

Of Blood-Letting in general, and its Origin; various Mistakes about it; its Effects consider'd only as an EVACUATION.

BY *Blood-Letting* I understand the Puncture, Incision, or Aperture of some Blood-Vessel, in order to take out of it such a Quantity of Blood as is judg'd proper and convenient. Now as the Blood-Vessels are of two Kinds, *viz.* either such as carry the Blood from the Heart to the extreme Parts, called *Arteries*; or else such, by which it returns from

from thence back again to the Heart, called *Veins*: Therefore an Incision of the former is called *Arteriotomy*, and of the latter *Phlebotomy*. The ancient Physicians, in Cases where they judg'd it necessary to take Blood away, order'd the *Veins* to be open'd much oftener than the *Arteries*; notwithstanding which, *Arteriotomy* was much more practis'd by them, than of latter Years; for, beside the temporal Artery, of which the present Practice only admits, in violent Head-Achs and Vertigo's, they frequently open'd that behind the Ears; in Pains of the Sides, of long Continuance, that between the Fore-Finger and Thumb; and in obstinate *Ischiadic* Pains, that upon the Instep.

As to the Original of *Blood-Letting*, what GALEN says of the *Goat*, and PLINY of the *Sea-Horse*, seem to me

me alike fabulous; not to mention the Improbability, that so useful an Invention in Physick should be owing to Chance, or the Instinct of Brutes. But however that be, it is undoubtedly a Practice of very great Antiquity, almost as old as Medicine itself, since *Hippocrates* speaks of it as a Thing very well known, and used in his Time, as well as by the Physicians who lived many Ages before him. And whoever was the Inventor of it, must be allow'd to have been a great Benefactor to Mankind, by introducing one of the most useful, effectual, and general Remedies in the whole Art of Physick, when rightly and judiciously made use of.

Various indeed are the mistaken Opinions concerning this excellent Practice, as well as the Abuses of it: The most absurd of all seems to be

that

that of some ignorant and obstinate Persons, who stiffly maintain, even at this very Day, that since the Blood is, as they term it, the Fountain and Treasure of Life, it ought never to be let out of the Body in any Case, or upon any Account whatever. Next to this is that mistaken Notion which many have unhappily taken up, that the first *Blood-Letting* will be an infallible Remedy in the worst Case that can happen; and for that Reason refuse to lose Blood, when it would be of Service, and sometimes defer it so long, till the Opportunity of receiving Benefit by it is entirely lost. On the other Hand, there are not wanting great Numbers of People, who are too profuse and lavish of their Blood; who, by too frequent *Blood-Lettings*, without any real Occasion, bring themselves under a Kind of Necessity

ſity of often repeating this Operation; and who, upon every the leaſt Diſorder, have immediate Recourſe to it. This, however, though it be indeed an Error, yet has a great Appearance of Reaſon on its Side; becauſe whoever conſiders the Exceſs, and irregular Way of Living, wherein the greateſt Part of Mankind indulge themſelves, will think it highly neceſſary to give frequent Relief to the overdiſtended Veſſels, by freeing them from ſome Part of their Load, and, at the ſame Time, procuring to the Body ſuch other good Effects as ariſe from ſuch an Evacuation.

The ancient Phyſicians were in nothing more ſuperſtitious, than in the Choice they made of the Veins from whence they caus'd Blood to be taken. There was ſcarce any Part of the Body where they did not order a Vein to be open'd upon ſome Occa-

ſion

ſion or other; nay, they almoſt aſ-ſign'd a particular Vein for the Diſ-orders of every particular Part. Now this ſeems to have been owing to their Ignorance of the Blood's Cir-culation: But ſince that great and uſeful Diſcovery made by our Coun-tryman, the immortal *HARVEY*, it might have been expected we ſhould have reaſon'd better about this Mat-ter; that it ſhould have been ſet in a much clearer Light than it ſeems as yet to have been; and that if at any Time, or upon any Occa-ſion, there be Room for Choice, that is, if it be preferable in any Caſe to take Blood from one parti-cular Part of the Body, rather than another, that the Practice ſhould have been, in ſome meaſure, aſcer-tain'd by Rules directing from what Veins of the Body Blood ought to be taken in moſt, if not in all Caſes

whatever. But this, I think, has never yet been done: And if by our Knowledge of the Blood's Circulation we are freed from the various Whims and Fancies of the Ancients, whose Practice was to open Veins in almost every Part of the Body, yet we seem to have fallen into a contrary Error, imagining it to be altogether indifferent from what Part soever Blood is taken; and therefore in most, if not in all Cases, open no other Veins than those of the Arm. This is evident from the present Practice, as well as from the Writings of our greatest and most eminent Physicians. There is, indeed, one Case in the other Sex, wherein bleeding in the Foot is generally order'd, and for very good Reasons; and there are some Diforders of the Head, in which bleeding in the Neck is sometimes directed, though, I think, for very bad ones: But, however, the Arm is the

Part

Part from whence Blood is generally taken. The Reason of which Practice I take to be this, that *Blood-Letting* has been chiefly regarded as no other than an Evacuation, with respect to the whole Body; and that the constant Effects of it, during the Operation, with regard to particular Parts, have not been sufficiently attended to. Indeed, when nothing more is intended by Phlebotomy, than a general Evacuation or Emptying of the Blood-Vessels all over the Body, 'tis wholly indifferent, and the End will be equally answer'd from what Part or Vein soever the Blood is taken: But then, on the other hand, it must be allow'd, or at least I shall endeavour to shew, that in very many, if not most Cases, 'tis highly preferable, not to say absolutely necessary, to open a Vein in one particular Part of the Body, rather than another.

In

In order to this, it will be necessary to consider the general Effects of *Blood-Letting* as an Evacuation, with respect to the whole Body, as well as the different Effects of it on its different Parts, according to the particular Place from whence the Blood is taken. After this, it will not be difficult to make appear, that in all Obstructions, Tumors, or Inflammations of any particular Part, the opening of a Vein in certain Places of the Body would be very doubtful, if not dangerous Practice; which, instead of lessening, would more probably increase the Disorder: Whereas, at the same Time, the letting out Blood from Veins in some other Part of the Body would be highly useful and advantageous; nay, perhaps, the very best Remedy the whole Art of Physick can furnish in such Cases. When this is

done,

done, I ſhall lay down ſome general Rules, to aſcertain the particular Part or Place from whence Blood ought to be taken in moſt, if not in all Caſes, that can poſſibly occur. And, laſt of all, I ſhall more particularly illuſtrate and explain thoſe Rules, by conſidering the peculiar Advantages of bleeding in the Neck, Arm, and Foot, and ſpecifying many particular Diſorders wherein ſuch a Choice and Diſtinction are abſolutely neceſſary.

Whenever any Blood-Veſſel is open'd, and a certain Quantity of Blood is let out of the Body, 'tis certain, that ſo much Blood as flows out at that Aperture, never returns to the Heart, nor circulates back again from the Heart to the extreme Parts, and conſequently that there is an entire Loſs of ſuch a Quantity, with reſpect to the Veſſels, that is, they

they are freed from so much of their former Load, or contain so much less than they did before: This, I think, is self-evident, and needs no Proof. Now from what Part of the Body soever that Blood is taken, and whatever the Quantity is, the Loss will, in a very short Space of Time, be communicated to the whole Body, and shar'd, in an equal Proportion, by every Blood-Vessel in it; that is to say, if one thirtieth, fortieth, or fiftieth Part of the whole Mass of Blood be taken away, every Vessel, or Part of the Body, will be freed from, or contain one thirtieth, fortieth, or fiftieth Share of Blood, less than it did before. Now this Diminution or Loss of Blood, be it great or small, when a Vein, and not an Artery, is open'd, will be first communicated to the right Auricle and Ventricle, and so to the Trunk of the

Aorta;

Aorta; for so far the Blood runs in one entire Body, without Separation or Division; but is afterwards distributed between the ascending Branches, and the descending Trunk of that Artery, according to the Difference of their Orifices: So that this Diminution will be communicated, after the same Manner, from these first Branches to the second, from the second to the third, that arise from them, and so on, through all the Subdivisions, as far as the *capillary* Ramifications; all which will equally share or partake of this Loss, according to their different Size and Capacity. Now this Diminution of Blood, or the Evacuation caus'd by *Blood-Letting*, must needs produce constant and lasting Effects, with respect to the Vessels, which will continue till the Quantity that was taken away be made up by Eating

 and

and Drinking, and the Veſſels become fill'd again as they were before. And after what Manner ſoever the Blood is let out of the Body, whether ſwiftly or ſlowly, at a large or ſmall Orifice, by the Inciſion of a Vein, by Scarification, or by Leeches, ſuppoſing the ſame Quantity to be taken away, the Evacuation will, in all Reſpects, be the ſame, and be communicated in the ſame Proportion to all the Parts of the Body. The only Difference that can ariſe in this Caſe, is, that as more or leſs Time is employ'd in taking away the whole Quantity, or making the total Evacuation, ſo that particular Evacuation that happens to the ſeveral diſtinct Parts of the Body, which is always in Proportion to the total Evacuation, will be perform'd in a longer or ſhorter Space of Time.

From what has been ſaid, 'twill be eaſy to conceive the various Effects

fects that muſt neceſſarily ariſe to the whole Body from *Blood-Letting*.

Firſt, Since in every *Blood-Letting* a certain Quantity of Blood, more or leſs, is always taken out of the Body, 'tis evident that what remains in it, muſt needs circulate through the Veſſels with more Eaſe and Freedom, than it did before, and be leſs liable to any Stop or Impediment in its Courſe. And as this Evacuation is always general, and equally communicated to all the Blood-Veſſels in the Body, 'tis certain that every kind of Tumefaction, Obſtruction, or Inflammation in any Part of it, that proceeds from too great a Quantity of Blood, muſt by that Means be leſſen'd and abated. 'Tis very well known, that thoſe Diſorders rarely happen in any but the ſmaller or *capillary* Blood-Veſſels, whoſe Orifices are ſo ſtrait, that the Blood, in its natural State, circulates

very slowly, if not with much Difficulty, through them; but, in all plethoric Habits of Body, and where the Blood is either too much rarefy'd, or else grown thick and fizy, this Difficulty will be increas'd; not to mention, that in such Cases the Diameters of the Capillaries will be lessen'd by the Plenitude and Distention of the larger Vessels, and the Pressure of the circumjacent Parts. Now whenever any Thing of this Kind happens, *Blood-Letting* is the proper and adæquate Remedy that answers every Intention, and renders the Circulation free and easy.

Secondly, By *Blood-Letting*, a certain Quantity of Blood being taken out of the Body, which did before distend and overstretch the Vessels, the contractile Fibres of their Coats will by that Means recover their elastic Power or Spring, and be enabled to contract with more Freedom, Force,

and

and Frequency. For the Blood, whenever it abounds too much, is a kind of Counter-Balance or dead Weight against the Action of the Solids; and therefore when any Part of that Load is remov'd, whether it be more or less, they must needs acquire in Proportion a greater Ease and Facility in acting. And being by this Means restor'd to their natural State, their Contractions will become more forcible, as well as frequent. By Virtue of this Force and Frequency of Action, the circular Motion of the Blood will be accelerated, its unnatural Cohæsions will be broke to Pieces, its whole Substance will be attenuated and subtiliz'd, and its Mixture become similar and uniform. By this Means all the Secretions, particularly that of the animal Spirits in the Brain, will be increas'd, the Consequence of which will

will be an Addition of new Life and Vigour to the whole Body. These, and many more, are the Advantages that arise from *Blood-Letting*, consider'd only as an Evacuation.

CHAP.

CHAP. IV.

Concerning the DERIVATION *and* REVULSION *that happen in every Blood-Letting, their different Effects, and in what Cases one is preferable to the other.*

'TIS self-evident, and, I believe, doubted by nobody, that in every *Blood-Letting*, or as often as a Vein is open'd in any Part of the Body, there is a certain Evacuation, or Diminution of Blood, with respect to the whole Mass; but that there is constantly a *Derivation*, or greater Quantity of Blood brought

brought into ſome Parts of the Body, during the Time of the Operation, than what uſually flow'd into them before in the ſame Space of Time, and conſequently a *Revulſion*, with reſpect to other Parts, that is to ſay, a Diminution of the Quantity of Blood that was naturally carried into them before the Veſſel was open'd; this, I ſay, is what ſeems not to have been ſufficiently attended to and conſider'd. But that this is true in Fact, will very eaſily be made appear: For while the Blood circulates within its Veſſels, that Part of it which goes before always reſiſts, and is a conſtant Impediment to the Motion of that which follows after; but by opening a Vein, the Blood finds a more free and eaſy Paſſage, the Impediment to its Motion is taken off, the Reſiſtance it met with before leſſen'd, and conſequently

quently its Circulation muſt needs be accelerated. Add to this, that in what Part of the Body ſoever a Vein is open'd, the Quantity of Blood contain'd therein will be very much diminiſh'd; by which there will be more Room for it to move in, than it had before; its Parts, moreover, will be leſs compreſs'd; nor will it be driven with ſo much Violence againſt the Inſide of the containing Veſſel, which is an Obſtruction to its Motion, and conſequently for that Reaſon, likewiſe, its Velocity muſt needs be increas'd. So that, I think, I may venture to lay it down as a certain Truth, that in every *Blood-Letting*, the Motion of the Blood is always accelerated in the Vein that is open'd, ſo long as the Aperture remains unſtopp'd. Now this increas'd Velocity of the Blood's Motion always begins in the Vein where

the Incision is made, close by the Side of the Orifice, next the extreme Part of the Body, whither it is continued backward in a very short Space by the smaller Veins, and by them communicated to the capillary Arteries that answer and bring Blood to them. Nor does this quicken'd Motion of the Blood stop here, but is from hence continued on along the arterial Canal, till at length it arrive at the Heart, either by the descending, or else by one of the ascending Branches of the *Aorta*, according to the Part of the Body from whence the Blood is taken. But, though upon opening a Vein in any Part of the Body whatever, such an increas'd Velocity of Blood does constantly happen, yet it is always different in the Vein and in the Artery that answers to it: 'Tis greater in the capillary Veins, than in the capillary

Arteries;

Arteries; 'tis greater, as it is nearer the Orifice, and less as it approaches nearer the Heart; but is even there sufficient to determine a greater Quantity of Blood to flow into that Branch of the *Aorta*, which answers to the Part where the Vein is open'd, than into any other, the Diameter of whose Orifice is equal to it.

The Quantity of Water driven through Pipes, and 'tis the same with the Blood that is thrown by the Heart into the Arteries, is always in a compound Proportion, with respect to the Orifices of the Tubes or Pipes, and in a reciprocal Proportion, with respect to the Resistance it meets with in its Entrance into them. So that where the Diameters of any Pipes or Vessels, and the Resistance the Fluid meets with in its Motion are exactly the same, there an equal Quantity of that Fluid will pass

through those Pipes or Vessels in any certain Space of Time; but whenever either the Diameters, or the Resistance, or both of them are different, there the Quantity will also differ, according to the forementioned Proportion. To make this Matter as plain as possible; let us suppose a Body of Water, constantly driven by any Force or Machine out of a large Tube into two less of an equal Capacity, and in the same Direction, so that they both receive the Water from the large Tube without any Obstruction or Impediment; in such Case, an equal Quantity of Water will be transmitted through each of them in any given Space of Time. But if you pierce one or more Holes in the Side of one of those small Tubes, or if it be made of such a Substance as is capable of being distended, and will give Way to the

Force

Force of the Water, in ſuch a Caſe, a greater Quantity of Water will be carried through this latter, than thro' the other: Becauſe, by this Means, both the Diameter of the Tube is increas'd, and the Reſiſtance to the Motion of the Fluid leſſen'd.

The Caſe of the Heart's throwing conſtantly a certain Quantity of Blood into the ſeveral Branches of the *Aorta*, though not exactly parallel, yet bears a near Reſemblance to Water driven through Tubes or Pipes. For though the Diameters of the Arteries are ſuppos'd to remain always the ſame, yet by opening a Vein in any Part of the Body, a freer Paſſage is given to the Blood, ſo that its Motion is accelerated from the Aperture in the Vein back to that Branch of the *Aorta* which receives Blood from the Heart, and conveys it to the Part; and conſequently,

quently, the Resistance to the Motion of the Blood into that Branch being lessen'd, a greater Quantity must of necessity flow into it than did before. And as by this Means the Blood will move faster than it did before, the Course of that which follows will be less obstructed by that which goes before it. Thus, if a Vein be open'd in the Foot, the Motion of the Blood will be accelerated so long as the Orifice remains open, from the Aperture to the capillary Veins, from the capillary Veins through the capillary Arteries, and from thence backward all along the arterial Canal to the descending Branch of the *Aorta* that receives the Blood from the Heart; and by this Means the Resistance to the Blood's Entrance into that Branch being lessen'd, a greater Quantity will enter into it than did before, and consequently

quently a leſs Quantity muſt flow into the aſcending Branches of that Artery. On the other hand, if by opening a Vein in any Part, to which Blood is convey'd by one of the aſcending Branches of the great Artery, the Reſiſtance to its Motion that Way is leſſen'd, and conſequently more Blood is deriv'd into that Branch than was before, juſt ſo much more as is carried that Way, juſt ſo much leſs muſt flow into the other principal Branches of the *Aorta*, becauſe what is gain'd one Way, muſt be loſt another: And upon this depends the whole Doctrine of *Derivation* and *Revulſion*. From hence, therefore, I think it appears very plainly, that in every *Blood-Letting*, or as often as a Vein is open'd in any Part of the Body, there always is both a *Derivation* and *Revulſion*, with reſpect to different Parts of it; the

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latter being a necessary Consequence of the former. A *Derivation* of Blood, that is, a greater Quantity of it will constantly be brought into that Part where a Vein is open'd, so long as it remains so, than naturally flow'd into it before; because the Resistance to the Blood's Entrance into that Branch of the *Aorta* which communicates with such Part, will be lessen'd by the accelerated Motion of the Blood that Way; and consequenty so much less Blood must necessarily be carried into the opposite Branch or Branches of the *Aorta* during that Time; which is a *Revulsion*, or Diminution of the usual Quantity of Blood, with respect to those Parts.

Thus it is apparent, that the necessary Effect of *derivative* Bleeding, is, the bringing a greater Quantity of Blood, during the Time of the Operation,

Operation, into that Part where the Vein is open'd, than what naturally flow'd into it before; the Consequence of which will be, that the capillary Vessels will be distended and over-charg'd with Blood, from whence Obstructions and Inflammations will probably arise; or if there happen'd to be any before in that Part, they will be increas'd; but if the Load be so great, that the Vessels are unable to bear it, in such Case their Coats must give way, and an Extravasation of Blood ensue. There are not many Cases wherein any Advantage is to be expected from derivative Bleeding; however, I shall mention three or four, in which it seems to be very rightly and judiciously order'd: In an Obstruction or Suppression of the *Menses*, when there is no Inflammation in the Womb, bleeding in the Foot

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is, no doubt, very uſeful. The ſame may likewiſe be very properly order'd to cauſe a Flux of the Hœmorrhoidal Veſſels, when neceſſary; or in order to remove the Gout downwards from the Head or Stomach. Whenever any particular Member of the Body, for want of a due Supply of Blood, ſeems, as it were, to wither and decay, and to be threaten'd with a Mortification on that Account, opening a Vein in the Part affected, in order to cauſe a greater Quantity of Blood to flow that Way, and to reſtore a due Circulation in it, will be good and laudable Practice. But in moſt Caſes, eſpecially where an Obſtruction or Inflammation is already begun in any particular Part, to bleed there will be ſo far from being of Uſe, that it will heighten and increaſe the Diſorder.

It

It cannot be expected that the antient Physicians, who were ignorant of the Blood's Circulation, and had only Experience for their Guide, could ever thoroughly understand this Matter, or be able to determine consistently with themselves about it; and yet they seem, for the most Part, to determine for *revulsive* Bleeding, whenever an Inflammation, Obstruction, or Congestion of Matter happen'd in any particular Part. If it would be of any Use, I could easily cite the Authorities of *Hippocrates*, *Galen*, *Oribasius*, *Ætius*, and many others, to confirm this. But then, on the other hand, it must be own'd, that even some of those very Authors, in other Parts of their Writings, contradict themselves, and give the Preference to *derivative* Bleeding. This, I say, is not to be wonder'd at, before the true Manner of

the Blood's Circulation was known but ſince that Diſcovery, which has given ſo much Light in this Affair, and enabled Men to reaſon upon plain and certain Principles, 'tis very ſurpriſing that *derivative* Bleeding ſhould ſtill have its Advocates.

The *Arabian* Phyſicians ſeem to have choſe a middle Way in this Diſpute, unanimouſly recommending *revulſive* Bleeding at the Beginning, and not allowing of *derivative* Bleeding, before ſeveral *revulſive* ones had preceded. This Practice is what has been generally follow'd ſince; it has been defended by ſome of the moſt eminent modern Writers, and is, I believe, what chiefly prevails to this Day. But however that may be, a very little Reaſoning will be ſufficient to ſhew that *derivative* Bleeding, at what Time ſoever uſed, will, in ſuch Diſorders, always do more

Hurt

Hurt than Good; though if it be not employ'd till after ſeveral *revulſive* Bleedings, it will be leſs hurtful, both by reaſon of the Advantage already obtain'd by thoſe Bleedings, and becauſe the Stock of Blood being by that Means diminiſh'd, a leſs Quantity will be thrown on the Part affected by *derivative* Bleeding, and with leſs Violence too, than if no *Revulſion* at all had preceded. Whenſoever an Inflammation happens in any particular Part, the Seat of ſuch Diſorder has been generally thought to be the capillary Arteries, the Blood, by reaſon of its too great Thickneſs and Viſcidity not being able to paſs freely through them; which Difficulty is likewiſe increas'd, by the Plenitude and Preſſure of the neighbouring Blood-Veſſels, by which Means the Orifices of the minute Arteries, where the Circulation is obſtructed,

obſtructed, are ſtill more contracted and leſſen'd. There is another Opinion eſpous'd by ſome Moderns concerning the Cauſe of Inflammations: Theſe Gentlemen affirm, that the Blood being great in Quantity, and circulating with ſo much Violence, diſtends and forces open the Mouths of the Lymphatick Arteries, ſo that ſome of its globular Parts inſinuate themſelves into thoſe Veſſels. But whether we hold the generally receiv'd Opinion, or elſe embrace this new Hypotheſis, 'twill plainly appear, that *derivative* Bleeding is, in both Caſes, equally improper: For if the Inflammation be owing to the Difficulty of the Blood's Circulation, by reaſon of its Viſcidity, and the Preſſure of the adjoining Veſſels, the deriving a greater Quantity upon that Part muſt needs increaſe the Diſorder, by impacting the obſtructed Mat-

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ter more ſtrongly upon it, and likewiſe cauſing a greater Plenitude in the neighbouring Veſſels: But if the Inflammation be ſuppos'd to proceed from the Blood's diſtending the Mouths of the Lymphatick Arteries, and forcing its Way into them by reaſon of its too great Quantity, or the Impetuoſity of its Motion, the determining a ſtill greater Quantity that Way by *derivative* Bleeding, will be ſo far from relieving, that it muſt needs heighten and increaſe the Inflammation. In this Caſe, therefore, it can never fail of being hurtful: But ſuppoſing the Inflammation or Obſtruction to be in the Blood-Veſſels, it may, perhaps, be ſaid in behalf of *derivative* Bleeding, that, in ſuch Caſe, the Blood, by its increas'd Quantity and Weight, will, like a Wedge, force open the Obſtruction, and carry all away before it,

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and ſo make an entire Cure at once: But this, how plauſible ſoever it may appear, is, I fear, very ſeldom true in Fact; and as often as it fails, 'tis moſt certain it will add very greatly to the Diſorder. But whatever be the Cauſe, and wherever the Seat of Inflammations is ſuppos'd to be, *revulſive* Bleeding is always uſeful: For the Courſe of the Blood being by that Means turn'd another Way, it will flow in leſs Quantity, and with leſs Impetuoſity into the Part affected; ſo that thoſe Parts which were before diſtended and overſtretch'd by too great an Afflux of it, will receive Eaſe and Relief, the Coats of the Veſſels will recover their former Tone, the ſanguiferous Arteries will be able to compreſs and attenuate the Blood, by which Means its Viſcidity will be overcome, and the Circulation be carried regularly on.

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The Lymphatick Arteries, moreover, being less press'd by the sanguiferous Vessels, will recover their Spring, and their Orifices be so contracted, as to hinder the Blood's entering into them: So that upon all Accounts whatever, it seems very evident, that *revulsive* Bleeding is highly useful in Obstructions, Tumors, Inflammations, *&c.* and, on the contrary, that *derivative* Bleeding is dangerous and hurtful.

CHAP. V.

General Rules, ascertaining the Place or Part of the Body from whence Blood *ought to be taken, in most Disorders, with the Consideration of several particular Cases.*

AS often as there is no Appearance of a Plenitude, Obstruction, or Inflammation, in any particular Part of the Body, and that nothing more is propos'd by *Blood-Letting*, than a bare Evacuation, or lessening the Quantity of Blood, 'tis in a manner altogether indifferent in what Part a Vein is open'd; and therefore

therefore the Arm, which gives the least Trouble both to the Patient and Operator, is generally the Place: But whenever a particular Part is affected, there seems to be Room for Choice; and therefore, in such a Case, I would humbly propose the following Rules as necessary to be observ'd.

Rule I. If the Part affected be such as receives Blood from Arteries that proceed from the descending Trunk of the *Aorta*, the Arm or Neck is the Part from whence Blood ought to be taken.

Rule II. If the Part affected be such as receives Blood from Arteries that proceed from any of the ascending Branches of the *Aorta*, then bleeding in the Foot is preferable to bleeding in any other Part whatever.

Rule III. But if the Part affected be ſuch as receives Blood from Arteries that proceed from the deſcending Trunk, and likewiſe from others that proceed from ſome of the aſcending Branches of the *Aorta*, and ſeveral ſuch Parts there are, then, if the Arteries, by which Blood is brought into the Part affected from the deſcending Trunk, be larger, or more in Number than thoſe which proceed from the aſcending Branches, that is to ſay, if more Blood be conſtantly brought into the Part by the former than the latter Arteries, in ſuch Caſe, the Part where a Vein ought to be open'd, is either the Neck or Arm: But if the Arteries, by which Blood is brought into the Part affected from one or more of the aſcending Branches of the *Aorta*, be larger, or more in Number than thoſe by which it receives Blood from

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the deſcending Trunk of it, then the Foot is the only Part from whence Blood ought to be taken.

In order to underſtand theſe Rules aright, it is neceſſary to know the Diviſion of the *Aorta* into its greater Branches, as well as the Diſtribution of the leſſer Arteries that ariſe from them, and which carry Blood to all the Parts of the Body; for which Reaſon, I have already given ſome Account of the ſeveral Ramifications or Branches of that Artery. But to make this Matter ſtill more plain and obvious to ſuch as are unskill'd in Anatomy, and yet preſume to take away Blood on all Occaſions indiſcriminately from the Arm; I ſhall in this Chapter particularly conſider moſt of thoſe Parts of the Body which come under the third Rule, that is to ſay, ſuch Parts as receive Blood

both

both from the deſcending Trunk, and alſo from ſome of the aſcending Branches of the *Aorta*, and ſhew from what Part of the Body Blood ought to be taken in the Diſorders of each of them. When I have done this, I ſhall more particularly ſpecify moſt of thoſe Caſes which come under the firſt and ſecond Rules.

The firſt Part of the Body I ſhall mention, which receives Blood both from Arteries that proceed from one of the aſcending Branches, and likewiſe from the deſcending Trunk of the *Aorta*, is the Breaſts. Theſe are chiefly ſupply'd with Blood by the external and internal *Mammary* Arteries, which ariſe from the *Subclavians*: And therefore bleeding in the Arm would be a Means of deriving a greater Quantity of Blood into thoſe Veſſels, which diſtribute it all over the Breaſts, and, conſequently, in any

Inflammation

Inflammation of those Parts, seems to be forbidden. But then it is to be observ'd, that the internal *Mammaries*, which arise from a superior Branch of the *Aorta*, have a Communication, and inosculate with the *diaphragmatic* and *epigastric* Arteries, both of which proceed from the descending Trunk of the great Artery: And therefore, with respect to these, bleeding in the Arm must occasion a Revulsion, so that the additional Quantity of Blood brought into the *Mammaries*, will not be very considerable. But we are to observe farther, that the Breasts receive Blood from Branches of the inferior *Intercostal* Arteries, which arise from the descending Trunk of the *Aorta*, and have a Communication with the external *Mammaries*. For these Reasons, therefore, though bleeding in the Arm would not be greatly hurtful,

yet

yet bleeding in the Foot is preferrable; especially if the Tumor or Inflammation of the Breasts be owing to an Obstruction of the *Menses* not duly and periodically discharg'd, or else to a Stagnation of the lacteous Humor in the Breasts after Childbearing. In these Cases, bleeding in the Foot procures a double Advantage; but should there happen at the same Time to be an Inflammation of the Womb, bleeding in the Foot would be so far from giving any Relief, that it would very much heighten the Disorder.

The Diaphragm or Midriff is another Part that derives Blood both from the *Aorta ascendens* and *descendens*; for, beside the *Phrenicæ*, it receives some small Branches both from the *Cœliac* and *Capsular* Arteries, all which proceed from the descending Trunk of the *Aorta*. But, beside

these,

theſe, it likewiſe receives Blood by Arteries that proceed from an aſcending Branch of the *Aorta*, viz. from the internal *Mammaries*, and ſome ſmall Twiggs from the *Pericardine* Artery, which loſe themſelves in this Part. And therefore, if by bleeding in the Foot a greater Quantity of Blood be brought into ſuch Arteries as proceed from the *inferior* Branch of the *Aorta*, thoſe that ariſe from the *ſuperior*, will, at the ſame Time, have leſs, and ſo be in a Condition to receive ſome of that Overcharge from below, and by that Means prevent any Damage which might otherwiſe happen from a new and greater Afflux of Blood to a Part already inflam'd. But yet this does not make it wholly indifferent, whether Blood be taken from the Arm or Foot in Diſorders of this Part, becauſe the Sum of the Orifices of the

Arteries that come from the *descending* Trunk, is much more considerable than that of such as proceed from the *ascending* Branch of the *Aorta*. And therefore as bleeding in the Foot will probably do more hurt, by Way of *Derivation*, with respect to the former, than by the *Revulsion* it can occasion, with regard to the latter, 'tis certain, that in all inflammatory Disorders of the Diaphragm, bleeding in the Arm is preferable.

Anatomy shews us that the *Œsophagus* or Gullet is, moreover, another Part of the Body that receives Blood from the *descending*, as well as from an *ascending* Branch of the great Artery. From the latter it is furnish'd with Blood by the anterior *Cervical*, the *Subclavian*, and the superior *Intercostal* Arteries. From the former, it is supply'd by the

Œsopha-

Œsophagœan, the inferior *Intercostal*, and the *Coronary Stomachic* Arteries, beside the *Bronchial*, which arises sometimes immediately from the descending Trunk of the *Aorta*, though at other Times from the superior *Intercostal* Artery. Wherefore in any Inflammation of the internal Coat, or Inside of this Canal, especially about the middle Part of it, 'tis altogether indifferent whether a Vein be open'd in the Arm or Foot. But in all inflammatory Disorders of the *Pharynx*, as well as of the upper Parts of the Gullet, which receive the greatest Share of their Blood from a superior Branch of the *Aorta*, bleeding in the Foot is preferable; and for the same Reason, in any Inflammation of the lower Parts of it, near the superior Orifice of the Stomach, Bleeding in the Arm is always to be preferred.

The *Pleura* is another Part I ſhall mention which receives Blood both from an aſcending Branch, and from the deſcending Trunk of the *Aorta*. This takes in, as it were, the whole Capacity of the *Thorax*; and 'tis very well known, that an Inflammation of it, which very often happens, is call'd a *Pleuriſy*. And therefore, to give proper Relief, as the Caſe requires, bleeding muſt be diverſify'd according as the different Parts of it happen to be the particular Seat of the Diſorder. For all that is propos'd to be done by *Blood-Letting* in this, and in all ſuch Caſes, is, to turn the Courſe of the Blood from that Part which is threaten'd with an interrupted Circulation, and to cauſe a Derivation of it the oppoſite Way. In all inflammatory Pains, therefore, of the Fore-part of the Breaſt, which receives Blood from *Mammary* Arte-

ries,

ries, and where the Seat of the Disorder is no lower than the fourth Rib, and so low the Body, is supply'd with Blood from the *Intercostal* Arteries, bleeding in the Foot is most useful; since by that Means a greater Quantity of Blood is deriv'd into the descending Trunk of the *Aorta*, and consequently a Revulsion is made, with respect to the superior Branches of it, and to all the lesser Arteries that spring from them. But when the inflammatory Disorder happens in the lateral or posterior Part of the *Pleura*, below the fourth Rib, bleeding in the Arm will be most advantageous; because the hinder Part of the Body, and the Sides from thence downwards, are furnish'd with Blood by the eight inferior *Intercostal* Arteries, which take their Origin from the descending Trunk of the *Aorta*. However, since it is certain that the superior

and

and inferior *Intercostal* Arteries have manifest and numerous Inosculations, and communicate very considerably with each other, the Damage will not be very great, if in the first Case Blood be taken from the Arm; nor much greater, if in the latter it be taken from the Foot; because in both Cases there is a *Derivation*, with respect to some of the Blood-Vessels, and a *Revulsion*, with regard to others: So that if some of them are obliged to receive more Blood than flow'd into them before, there are others at the same Time which receive less than their usual Quantity; and so by Means of their Communication, take their Share of the Over-charge, and help to free the others from some Part of their Burden. But here it is to be observ'd, that 'tis much more dangerous to bleed in the Foot, when the Part where the Inflamma-

tion

tion lies are ſupply'd with Blood from the *Intercoſtals* that ariſe from the deſcending Trunk of the *Aorta*, than to bleed in the Arm, when the inflam'd Part receives its Blood from the ſuperior *Intercoſtal* Arteries; becauſe, in the firſt Caſe, there is a Derivation of the Blood into eight Arteries, and a Revulſion only with reſpect to three or four, and to ſome ſmall Branches of the internal *Mammary* Arteries, which have a Communication with them: But, in the latter Caſe, an increas'd Quantity of Blood is only brought into three or four Arteries, and eight receive leſs than they did before; and therefore are capable, and by reaſon of their Inoſculation, cannot avoid receiving ſome Part of the Load with which the ſuperior *Intercoſtals* are overcharg'd. Add to this, that the forementioned Danger will be ſtill greater, when

when it happens, as it ſometimes does, that all the *Intercoſtal* Arteries, ſuperior, as well as inferior, take their Riſe from the deſcending Trunk of the great Artery.

The Lungs, which are contain'd within the *Pleura*, deſerve a particular Conſideration in this Place, tho' they come properly under none of the Rules I have before laid down; for they are the only Part of the Body, except the Heart, which is ſupply'd by the *Coronaries*, that does not receive Blood from ſome of the Branches of the great Artery. But as they are a noble and uſeful Organ, of a nice and delicate Make, and conſequently very liable to Inflammations, which often prove fatal, it will be very proper to enquire whether Bleeding in the Arm, Foot, or any other Part is attended with any particular Advantage, or whether

it

it be altogether the ſame, in order to relieve them, when obſtructed or inflam'd.

The Lungs receive Blood from the *Pulmonary* Artery, that ariſes out of the right Ventricle of the Heart, which in Adults has no immediate Communication with the *Aorta*. Now every *Blood-Letting*, whatever Veſſel is open'd, is always continu'd to ſome *Ramification* or other of the great Artery; and, beſide leſſening the Quantity of Blood, the conſtant Effect of it is to haſten, in ſome meaſure, its Circulation in particular Places, and by that Means derive more into ſome Parts, and leſs into others. But in what Place of the Body ſoever a Vein is open'd, it can never extend its Influence ſo far, as can any way affect or alter the Motion of the Blood in the *Pulmonary* Artery; it can neither determine a

larger Quantity to flow into the Lungs by it, nor divert its Course another Way. And therefore, with respect to them, Bleeding either in the Arm, Foot, or any other Part, will have no particular Effect, but be altogether the same Thing, that is to say, it will neither be *derivative*, nor *revulsive*, but only *evacuative*.

But, beside what is constantly convey'd into the Lungs by the *Pulmonary*, it must be own'd, that they, moreover, receive Blood from the *Bronchial* Artery, whose Origin is very uncertain. For, according to the Observations of Mr. *Ruysch*, it sometimes arises from the descending Trunk of the *Aorta*, or else from the inferior *Intercostal* Arteries, which are Branches of it: And it also very often takes its Rise from the last of the superior *Intercostal* Arteries, which, coming

coming from the *Subclavians*, belongs to an aſcending Branch of the great Artery. Now, in the firſt Caſe, was it poſſible to be known, it would, no doubt, be preferable to let Blood in the Arm, to prevent a Derivation of it into the Lungs by the *Bronchial* Artery during the Time of bleeding; and, in the latter Caſe, if that could be known, bleeding in the Foot would be moſt eligible for the ſame Reaſon. But as it is impoſſible to be certain of that Artery's Riſe in any Subject, without an Anatomical Search, Nature, by a curious Piece of Mechaniſm, ſeems to have provided againſt the Danger of the Lungs being over charg'd with Blood, from a Derivation of it thro' that Artery in the Time of bleeding, by making it communicate with the left *Pulmonary* Vein, which carries Blood from the Lungs; and, more-

over; by its Communication with the *Coronary* Artery, which is less full at that Time, and consequently more capable of receiving a Share of that Surplus of Blood, which may happen to be deriv'd into the *Bronchial* Artery by bleeding. Upon this Account, there seems to be no great Room left for Choice, as to the Part of the Body from whence Blood ought to be taken; nor will a Mistake, which it is impossible sometimes to avoid, be attended with any very ill Consequence. And therefore, not to depart from an establish'd Practice without good Reason, and likewise because it is most commodious and easy, the Arm is the Part from whence Blood will always be taken in any Disorder of the Lungs.

But if there are two *Bronchial* Arteries in most Bodies, and that

'tis

'tis very rare to find the contrary, as Mr. *Winslow* assures us, one of which takes its Rise from an ascending Branch, and the other from the descending Trunk of the great Artery; then will it be wholly indifferent in all Inflammations of the Lungs, where no other Part is affected, whether Blood be taken from the Arm or Foot; because, in both Cases, as there will constantly be a *Derivation* of Blood upon the Lungs by one of the *Bronchial* Arteries, so will there always be a *Revulsion*, with Respect to the other.

In order, therefore, to determine aright from whence Blood should be taken in *Peripneumonic* Disorders, an exact Enquiry ought to be made, whether any Part, beside the Lungs, be affected at the same Time; for, in such a Case, if the other Part

affected

affected happen to be ſituated above the Lungs, particularly if there be any Diſorder of the Head or Brain, any Frenzy, Delirium, or Drowſineſs, bleeding in the Foot will be highly preferable; becauſe it will moſt effectually relieve all the ſuperior Parts of the Body by its Revulſion, and, at the ſame Time, be equally advantageous, with reſpect to the Lungs. But if an Inflammation of the Lungs happen to be attended with a complicated Diſorder of ſome Part ſituated below them, particularly, if there be at the ſame Time an *Eryſipelas* of the Liver, or any *Viſcus* contain'd within the Abdomen, bleeding in the Arm will always claim the Preference.

CHAP.

CHAP. VI.

Of Bleeding in the TEMPORAL ARTERY, *and* JUGULAR VEIN; *and whether, in any Case, preferable to Bleeding in another Part.*

GREAT Endeavours have been used by some Persons to introduce the Practice of *Arteriotomy*; it has been wonderfully cry'd up and extoll'd as infinitely preferable to *Phlebotomy* on many Accounts, and the mighty Feats perform'd by it, particularly in Apoplexies, inveterate Head-Achs, *&c.* have been pompously set forth. I shall not contradict

tradict the Patrons and Encouragers of this Practice in what they affirm, or deny the particular Facts they aſſert: All I ſhall ſay, is, that though I have known the Operation ſeveral Times perform'd, I never once knew it anſwer Expectation. For, to ſpeak reaſonably, according to the Nature of the Thing, what greater Advantage can poſſibly be expected from the ſame Quantity of Blood flowing out of an Artery, than when it is taken from a Vein? Both Veins and Arteries are known to be nothing more than Tubes or Pipes, correſponding, or continued to one another, through which the Blood circulates; the latter carrying it from, and the former bringing it back again to the Heart. Theſe, therefore, cannot be ſuppoſed to communicate any Qualities, either good or bad to the Blood, nor can the Blood itſelf well

be

be imagin'd to have contracted any in passing out of the one into the other. If there be any Difference at all between venal and arterial Blood, the latter is allow'd to be more florid, more elaborated, and better mixed, by having lately passed through the Heart: And therefore 'tis difficult to assign a Reason why the Loss of a certain Number of Ounces of better Blood, should, in any Case, be more beneficial than the Loss of an equal Quantity of that which is worse. This Difference, however, must be allow'd between opening an Artery and a Vein, that, in the former Case, the Blood flies out of the Orifice by Starts, after such a rapid and violent Manner, as gives a kind of Horror to the Beholders; the Evacuation consequently must be speedy, and the Derivation upon the neighbouring Parts quick and strong:

And when the Orifice is ſtopp'd, the Violence with which the Blood will be darted againſt the Sides of the Veſſels, will give them ſuch a Shock, as may endanger a Rupture of them; eſpecially, if it be conſider'd how nice and delicate the Part is, where this is like to happen, and how unable to reſiſt an encreas'd Force of the Blood.

But perhaps the great Effects that are aſcrib'd to the taking away Blood from the *Temporal* Artery, may be thought to be chiefly owing to its Situation, and Vicinity to that Part, towards the relieving of which it is affirmed to be ſo effectual; becauſe there are ſome, who prefer bleeding in the *Jugular* Vein, which is not far diſtant from it, in all Caſes, wherein opening the *Temporal* Artery has been judg'd ſo uſeful. And indeed, it muſt be own'd, that the

neceſſary

neceſſary Effects which ariſe from bleeding in both of them, are pretty near the ſame. And yet, notwithſtanding this, as, on the one Hand, I can by no Means think it neceſſary to open the *Temporal* Artery in any Caſe whatever, ſo, on the other, I will not deny, but in ſome Caſes and Circumſtances, bleeding in the *Jugular* Vein may be attended with peculiar Advantages. To ſay otherwiſe, would be to contradict Experience, as well as the Teſtimony of the beſt and moſt judicious Phyſicians. The learned and ingenious Dr. *Freind* in particular, has aſſur'd us, that he found bleeding in the *Jugular* Vein very effectual againſt Frenzies that happen in Fevers, when all other Remedies had fail'd. But yet with all due Regard to the Authority of ſo great a Man, I will venture to affirm, and lay it down

as a general Rule, that, at the Beginning of moſt, if not all Diſorders of the Head, whether external or internal, bleeding in the *Jugular* Vein, and the ſame holds true of the *Temporal* Artery, is very improper; becauſe, by ſo doing, there muſt be a Derivation of Blood upon thoſe Parts that were over-charg'd with it before, which muſt therefore, of Neceſſity, rather add to, than remove the Cauſe of ſuch Diſorders. This will appear very plainly, if we recollect the firſt and principal Diviſion of the great Artery, upon which the *Derivation* and *Revulſion* that happen in every *Blood-Letting* depends, and at the ſame Time conſider the particular Veſſels by which Blood is carried to the ſeveral Parts of the Head. Now what I underſtand by the principal Diviſion of this Artery, is, firſt of all the right *Subclavian*; from

from which the right *Carotid* Artery takes its Rise soon after; then the left *Carotid*; next to that the left *Subclavian*; and last of all, the descending Trunk. From one or other of these Arteries, by means of the Branches that arise from them, Blood is carried into all the Parts of the Body, the Heart; which receives it from the *Coronaries*, and the Lungs from the *Pulmonary* and *Bronchial* Arteries, only excepted. Now the whole Quantity of Blood, which is constantly thrown out by the Heart in every *Systole*, or Contraction of its left Ventricle, is divided among those four Branches of the great Artery, in proportion to the Magnitude and Capacity of their Orifices, because the Resistance it meets with in its Entrance into them all, is suppos'd to be the same. But during the Time of *Blood-Letting*, this Resistance is

lessen'd

leſſen'd at the Mouth of that Branch of the *Aorta*, from whence Blood is carry'd to the Veſſel that is open'd; and conſequently a greater Quantity of Blood will be deriv'd into that Artery, and the Branches that proceed from it, than uſually flow'd into them before: And therefore all the other principal Branches of the great Artery, and thoſe that ſpring from them, muſt neceſſarily receive leſs than their uſual Proportion; becauſe what is gain'd by the firſt, is pure Loſs, with reſpect to the reſt. Thus, for Inſtance, if a Vein be open'd in the right Arm, the Blood which follows after, finding leſs Reſiſtance from that which goes before, and meeting with a freer Paſſage, its Motion in that Vein will be accelerated, and continued back to the Artery that anſwers to it; and ſo on, till it comes to the Mouth of the

right

right *Subclavian*, where it will likewise meet with less Resistance than usual, and consequently a greater Quantity will flow into it than did before. With respect to this Artery, therefore, to the right *Carotid*, and the Branches that spring from them, there will be a *Derivation*; but with regard to the left *Carotid*, the left *Subclavian*, and the descending Trunk of the *Aorta*, there must of necessity be a *Revulsion*, that is, they must receive less, because the Surplus that is deriv'd into the right *Subclavian*, by *Blood-Letting*, above the usual Quantity that flow'd into it at other Times, is, as was said before, so much Loss, with respect to the other three Branches.

Let us now proceed to consider the particular Vessels by which the Head is supply'd with Blood, that we may be the better able to judge of

of the Effects that muſt neceſſarily follow from opening the *Temporal* Artery or *Jugular* Vein: Now theſe are the *Carotid* and *Vertebral* Arteries. The *Vertebrals* arrive from the *Subclavians*, and in their Aſcent beſtow ſome ſmall Branches on the *Medulla Spinalis*, and on the Muſcles and Teguments of the Neck, but diſperſe themſelves chiefly, and loſe themſelves at laſt in the *Cerebellum*. The *Carotid* Arteries are divided into two conſiderable Branches, call'd the *Internal*, and the *External*; by the latter of theſe, Blood is convey'd to all the external Parts of the Head; whilſt the former entering the *Cranium*, is divided almoſt into infinite Ramifications, which are diſtributed all over the Subſtance of the Brain. The *Temporal* Artery is known to be a Branch of the external *Carotid*; the neceſſary Conſequence of opening which,

which, will be an Acceleration of the Blood's Motion from the Aperture up to the Origin of the *Carotid* Artery; so that the Resistance to its entering into that Artery being lessen'd, a greater Quantity will flow into it than did before, and consequently there will be a direct and strong *Derivation* upon all those Parts which receive Blood from the *external*; and, at the same Time, a collateral *Derivation* upon such as receive it from the *internal* Branch of the *Carotid* Artery.

In the next Place, in order to form a right Judgment as to the Advantages or Disadvantages of opening the *Jugular* Vein, we are to observe, that there are four Veins so call'd, *viz.* two *internal*, and two *external*. 'Tis by the first of these that the greatest Part of the Blood is received from the *Sinus's* of the Brain, which

 had

had been brought into it before by the internal *Carotid* Artery. This Vein, I mean the internal *Jugular*, lies ſo low, that it is never open'd; and therefore 'tis from the external *Jugular* only that Blood is always taken. This external *Jugular* Vein is form'd by the Union of ſeveral ſmall Veins, which take their Riſe on the external Part of the Head, to which Blood is brought by Branches of the external *Carotid*, from whence the ſeveral minute Ramifications of this Vein receive their Blood; ſo that the Conſequence of bleeding in the *Jugular* Vein, with reſpect to all the Parts of the Head, both external and internal, will be exactly the ſame with that of opening the *Temporal* Artery; that is to ſay, if the *Jugular* Vein be open'd on the left Side of the Neck, there will be a Derivation of Blood into the Trunk of

the left *Carotid* Artery, and from thence upon all the Parts which receive Blood from both the Branches of it: But if the *Jugular* Vein be open'd on the right Side, there will not only be an additional Quantity of Blood deriv'd into both the Branches of the right *Carotid*, but likewise into the right *Subclavian* Artery, and all the Branches that proceed from it, since the right *Carotid* takes its Rise from the right *Subclavian*, as has been observ'd before.

From hence, therefore, I think it will very evidently follow,

First, That in all Wounds of the *Pericranium*, in an *Erysipelas* of the Face, and in all Tumors and Inflammations of the external Parts of the Head, bleeding in the *Jugular* Vein is very improper, since it will cause a *direct Derivation* into the several Branches of the external *Carotid*;

and ſo, inſtead of leſſening, increaſe the Diſorder.

Secondly, That in all Inflammations of the Brain, or Diſpoſitions towards 'em, in all internal Diſorders of the Head, when its Veſſels are over-loaded with Blood, ſo that the Circulation is retarded, and there is danger of an *Extravaſation*, bleeding in the *Jugular* Vein is improper; becauſe it will occaſion a collateral Derivation into the internal *Carotid*, and into the minute Ramifications of it, which diſperſe themſelves all over the Subſtance of the Brain; by which Means, the Plenitude of the Veſſels will be increas'd, the Blood's Paſſage through them render'd more difficult, and the Obſtruction or Inflammation heighten'd.

Thirdly, That in all Tumors or inflammatory Diſorders of the right Arm, or the upper Part of the Breaſt

on

on that Side, bleeding in the right *Jugular* Vein is improper; becauſe by that Means an increas'd Quantity of Blood will be brought into the right *Subclavian* Artery, whoſe Branches convey Blood to all thoſe Parts.

Fourthly, That though bleeding in the left *Jugular* Vein be *revulſive*, with reſpect to both the *ſubclavian* Arteries, and to the deſcending Trunk of the *Aorta*, and therefore might be uſefully employ'd, when the Arms, Breaſt, *Viſcera* of the lower Belly, or any of the inferior Members of the Body are affected, yet it would be improper ſo to do, becauſe it would be highly imprudent to over-charge ſo noble a Part as the Head, to diſtreſs and endanger the Capital, for the Sake of ſuccouring Places of leſs Conſequence, and giving Relief to Parts, whoſe Maladies are leſs fatal. But whenever it

is

is judg'd neceſſary to open either of the *Jugular* Veins, the left is always the moſt eligible, with reſpect to the Head; becauſe, in ſuch Caſe, an increas'd Quantity of Blood will be brought upon the Brain by the *Carotid* Artery only; whereas by opening the right *Jugular*, there will be a Derivation of it upon that Part by the *Vertebral*, as well as the *Carotid* Artery.

I am not ignorant that what I have here aſſerted is contrary both to the Practice and Writings of the moſt eminent Phyſicians of this, as well as former Ages, who, in Apoplexies, Vertigoes, inveterate Head-Aches, and moſt other Diſorders that affect the Head, almoſt unanimouſly direct bleeding in the *Jugular* Vein. But if what is here laid down be built upon ſo ſolid a Foundation, as the Diſtribution and Communication of

of the Blood-Veſſels, the known Laws of the Circulation of the Blood, and the neceſſary Effects that conſtantly reſult from it, it will be able to ſtand its Ground againſt all Oppoſition whatever.

But notwithſtanding what has been ſaid againſt opening the *Jugular* Vein, ſince I have before allow'd, that in ſome Circumſtances it may have its peculiar Advantages, ſince daily Experience confirms its Uſefulneſs in ſome Caſes, and ſince it comes recommended by ſuch Authorities as cannot be withſtood, I ſhall proceed to examine this Matter very briefly.

Now the good or bad Effects from bleeding in the *Jugular* Vein, ſeem to depend intirely on the Quantity of Blood in the Body at the Time of ſuch *Blood-Letting*. If Blood be taken from the *Jugulars*, at the Beginning of any Diſorders of the

Head,

Head, when the Veſſels of the Brain are full of Blood, it will occaſion ſo quick and ſtrong a Derivation of it upon that Part, as will, very probably, be attended with ill Conſequences; but if the Blood has been ſo far diminiſh'd by ſeveral *Blood-Lettings*, that the additional Quantity deriv'd into the Trunk of the *carotid* Artery, is not more than what is turn'd aſide from the Brain by Revulſion into the external Branch of it; in ſuch Caſe, it will have no other Effect, than the ſame Quantity taken from any other Part of the Body would have produced. Whenever therefore a great Number of *Blood-Lettings* from other Parts have preceded, ſo that the Maſs of Blood is very much diminiſh'd, in ſuch Caſe, bleeding in the *Jugular* Vein will be highly advantageous; becauſe it will occaſion a *lateral* Revulſion from the

Brain

Brain by the Branches of the external *Carotid*, that will be more immediate, as well as quicker and ſtronger, than could have been procur'd by bleeding in any other Part. And this, no doubt, was the Caſe, wherein Dr. *Freind* found it ſo effectual againſt Frenzies in Fevers, though he has not particularly ſpecify'd it. From hence we ſee that opening the *Jugular* Vein, which is generally *derivative*, with reſpect to the Brain, and conſequently dangerous, may yet, in ſome Circumſtances, become *revulſive*, and ſo be very uſefully employ'd. This, though it may ſeem a little ſtrange, if not contradictory, might very eaſily be made appear, would the intended Brevity of this Eſſay permit.

But ſince Bleeding in the *Jugular* Vein is hazardous, and will always be hurtful when the Veſſels are full

of Blood; and ſince 'tis difficult, if not impoſſible, to know exactly when they are ſo far emptied, as to make it become uſeful, it ought to be undertaken with great Caution; and, in order to make a *Revulſion* from the Brain, I think it would be more adviſeable to ſubſtitute in its Stead repeated *Blood-Lettings* in the Foot; which would ſeldom fail of producing the ſame Effect, and, at the ſame Time, be always free from Danger or Hazard.

CHAP.

CHAP. VII.

Of BLEEDING *in the* ARM; *when improper; and in what Cases preferable to bleeding in any other Part.*

THE Ancients, being ignorant of the Nature and Effects of the Blood's Circulation, were vainly superstitious, not only about the particular Parts of the Body, but likewise about particular Veins in those Parts, from whence they directed Blood to be taken on various Occasions. They imagin'd the Head was best reliev'd by opening one Vein, the Liver by another, and so of several

other Parts of the Body. But all this was without any Reason at all, or the least Foundation in Nature. And, though in some Cases, there are sufficient Grounds to make Choice of one particular Part of the Body preferably to any other, from whence to take Blood away, yet, according to the present Practice, the Arm seems, in a Manner, to be the only Part from whence it is directed to be taken. There are but few that are fond of cutting the *Jugular* Vein, or *Temporal* Artery; and 'tis very rare to find Bleeding in the Foot particularly directed. This is what I have been pretty much surpriz'd at for several Years; and tho' I would by no Means presume to censure the general Practice of an Age, or Nation, yet I doubt not but to make it appear in this and the following Chapter, that there are *many* Cases where-

in opening a Vein in the Arm is very improper, not to ſay hurtful; and perhaps *more*, in which Bleeding in the Foot is highly preferable to Bleeding in any other Part of the Body.

When, indeed, the Intention in *Blood-Letting*, is no other than to empty the Veſſels, and procure ſome one or more of the Advantages that always reſult from it as an *Evacuation*, as likewiſe in Caſe of any ſudden Accident, where Time is precious, if the Head be no Way affected, nor opening a Vein in any other Part particularly indicated, Bleeding in the Arm will always have the Preference; becauſe perform'd with the leaſt Trouble, and moſt Expedition.

Now the Veins of the Arm, which are uſually open'd in *Blood-Letting*, are either the *Cephalica*, the *Baſilica*, or the *Mediana*. As to the Effects,

'tis

'tis wholly indifferent, in all Cases whatever, from which of the three Blood is taken; and therefore the Choice ought always to fall upon that which presents itself best, and may be open'd without Danger. But if there should be the least Difficulty in pricking any of these three, Blood may be taken from one of the largest Branches that appear in the Wrist, or on the Back of the Hand, or else from the *Salvatella*, with equal Advantage, and to answer all the same Ends and Purposes. And to imagine there is more Virtue in opening any one Vein in the Arm or Hand than another, or that any particular Part of the Body is more relief'd by so doing, is mere Fancy and Foppery, and owing to nothing but Ignorance, or Superstition: For since those three Veins all receive the Blood that passes through them, originally from

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the *Subclavian*, by Means of the *Axillary*, *Brachial*, *Cubital*, or *Radial* Arteries, and all of them return it back again into the ſame common Receptacle, or Vein; from which ſoever of them Blood is taken, the Effect muſt neceſſarily be the ſame.

But though it be altogether indifferent from which Vein of either Arm Blood is taken away, yet it is not ſo, with reſpect to the Arms themſelves; for there is a very conſiderable Difference between Bleeding in the right, and in the left Arm. This will appear a Paradox to ſuch as are unacquainted with Anatomy; but they who know the Origin and Situation of the principal Branches of the *Aorta*, will ſoon perceive the Reaſon of it. The neceſſary Conſequence of opening a Vein in either of the Arms, will be the Influx of a greater Quantity of Blood into the *Subcla-*

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clavian Artery, and into the Branches that proceed from it. But as there is no Communication at all between the *Subclavian* and *Carotid* Arteries on the left Side, whenever Blood is taken from the left Arm by Phlebotomy, it will occasion a *Revulsion*, with respect to the *Carotid* Artery; and a *Derivation* towards the superior Parts by the *Vertebral* only, which arises from the *Subclavian*. But since it is well known to all who are skill'd in Anatomy, that the right *Carotid* Artery takes its Rise from the right *Subclavian*, and is the first Branch that proceeds from it, whenever a Vein is open'd in the right Arm, beside what Blood is deriv'd by the *Vertebral* Artery, there will be a *direct Derivation* all over the very Substance of the Brain by the internal Branch of the *Carotid* Artery, and a *collateral* one by the

external

external Branch of it. Therefore in all Diſorders of the Head, in all Kinds of Madneſs, whenever the Veſſels of the Brain are over-diſtended with Blood, or elſe by Reaſon of its Thickneſs and Viſcidity the Circulation through them is retarded, when there is any Reaſon to apprehend an Obſtruction, or Inflammation, or that the Brain is any Way in Danger, as it is in all Fevers, bleeding in the *left* is by far preferable to bleeding in the *right* Arm.

But beſide this, there is another Reaſon taken from the Situation of the left *Subclavian* Artery, why Phlebotomy in the *left* Arm ſhould, in ſome other Caſes, be preferr'd to bleeding in the *right*. 'Tis certain that bleeding in either Arm is always *revulſive*, with reſpect to the inferior Parts of the Body; and therefore, in all inflammatory Diſorders of any

of the *Viſcera* of the lower Belly, or of any other Part, which receives Blood from Arteries that proceedfrom the deſcending Trunk of the *Aorta*, it is very properly uſed; but the left *Subclavian* is ſo ſituated, that the Blood is thrown directly out of the left Ventricle of the Heart into the Mouth of it, with the utmoſt Force and Rapidity; whereas it does not enter the right *Subclavian*, till its firſt *Impetus* is, in ſome meaſure, leſſen'd, and it has been, as it were, reverberated back again. For this Reaſon, it ſeems as if a quicker and ſtronger *Revulſion* would happen to the lower Parts of the Body, by bleeding in the *left* than in the *right* Arm, and therefore that in all ſuch Caſes it ought to be preferr'd.

Having thus ſtated the Difference between *Phlebotomy* in the *right* and in the *left* Arm, I ſhall proceed to

consider in what Cases Bleeding in either of them is improper. And here I might content myself with laying it down as a general Rule, that it always is so, as often as there is any particular Disorder, Obstruction, or Inflammation, or even a Tendency towards either of them, in any Part which receives Blood from one of the superior Branches of the *Aorta*. But, to be more particular,

First, It is improper to bleed in either of the Arms, whenever any of the internal Parts of the Head are particularly affected, whether it be the Brain itself, its *Meninges*, or the *Cerebellum*, because it will always occasion a Derivation upon those Parts by the *Vertebral* Artery, which is a Branch of the *Subclavian*; but if it be in the right Arm, there will be a

farther Derivation by both the Branches of the *Carotid* Artery.

Secondly, In all Tumors and Inflammations of the external Parts of the Head and Neck, 'tis improper to bleed in the Arm, and especially in the right; which, beside what is always deriv'd upon the Muscles and Teguments of the Neck by the *Vertebral* Artery, causes a considerable Addition of Blood in the outward Parts of the Head on that Side by the external *Carotid* Artery, which carries Blood thither.

Thirdly, 'Tis improper to bleed in the Arm, when there is any Inflammation of the *Mediastinum*, *Pericardium*, *Sternum*, or Shoulders; because Blood is convey'd to those Parts by the *Mediastine* and internal *Mammary* Arteries, which arise from the *Subclavian*; and likewise by the external

Mammary

Mammary and *Scapulars*; which are Branches of the *Axillary* Artery.

Fourthly, It is improper to bleed in the Arm, whenever there is any Wound, Tumor, or Inflammation in any Part of the ſame Arm, or Hand, becauſe there will be a direct Derivation by the *Axillary*, *Brachial*, &c. Arteries upon the Part affected, which, inſtead of leſſening, will heighten the Diſorder.

Fifthly, 'Tis improper to bleed in the Arm in a true or real Pleuriſy, when the *Pleura* itſelf, or the internal *Intercoſtal* Muſcles are inflam'd; as likewiſe in a falſe one, when the external *Intercoſtal* Muſcles only are affected, provided the Seat of the Diſorder be no lower than the fourth Rib; becauſe, in the firſt Caſe, Blood is carry'd to the Part affected by the ſuperior *Intercoſtal* Artery; and, in the

the latter, by the anterior and posterior *Thoracic* Arteries, both which are Branches of the *Axillary*.

The Reason why it is affirm'd to be improper to bleed in the Arm in all the forementioned Cases, I take to be very evident from the Principles already laid down; but to make it still more plain, it may not be amiss to recapitulate, and apply to bleeding in the Arm in particular, what has been said before concerning *Blood-Letting* in general. Most, if not all Inflammations, and other Disorders of any particular Part, are generally, if not always, owing to too great a Quantity of Blood, and its obstructed Circulation in that Part. Now the proper Method of Relief in such a Case, is, to lessen, as far as may be, the Afflux of Blood that Way; and therefore, to *derive*

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an additional Quantity upon it, muſt, of Neceſſity, contribute to the Diſorder, and endanger the Part. But by opening a Vein in either of the Arms, a freer Paſſage is given to the Blood that Way, becauſe the Reſiſtance being leſſen'd, its Motion is quicken'd: This begins at firſt near the Orifice, but is continued back by the Vein to the Branch of the Artery from whence it receives its Blood; and from thence backward all along the arterial Canal to the Mouth of the *Subclavian* Artery, into which a greater Quantity of Blood muſt conſequently enter during the Time of *Blood-Letting*, than naturally flow'd into it before in the ſame Space of Time. Now this increas'd Quantity of Blood muſt be divided among the ſeveral Arteries, which take their Riſe from the *Subclavian*; into ſome of them it will be *deriv'd directly*, into

into others *collaterally*; into ſome more, into others leſs, according to their different Size, Origin, and Situation. From theſe it will be farther ſubdivided and continued on through the ſeveral Branches that ariſe from them, 'till at laſt it arrive in the *capillary* Arteries of each Part, which, by this Means, will receive an additional Quantity of Blood: And therefore, if ſuch Part labour'd before under any Diſorder caus'd by too great a Quantity of Blood, or its retarded Circulation, that Diſorder, by bleeding in the Arm, will be farther increas'd. Now, in all the Inſtances, wherein it has been affirm'd, that Bleeding in the Arm is improper, the Part affected is ſupply'd with Blood from Branches which receive it originally from the *Subclavian* Artery.

As therefore by bleeding in either of the Arms, there will be a *Deriva-*

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tion, or a greater Quantity of Blood, will, during the Time of *Blood-Letting*, enter into the *Subclavian* Artery on the Side where the Vein is open'd, than flow'd into it before in the ſame Space of Time; it neceſſarily follows, that, with reſpect to the other Branches of the *Aorta*, that is to ſay, the oppoſite *Subclavian*, and the deſcending Trunk, there muſt be a *Revulſion*, or a leſs Quantity muſt enter into them; becauſe the Quantity gain'd by the former is ſo much Loſs to the latter, which would otherwiſe have received their uſual Share. Bleeding, therefore, in the Arm muſt always neceſſarily cauſe a real *Revulſion*, with reſpect to thoſe two Arteries, and all the Branches that proceed from them. Now, in directing this *Revulſion* aright, by turning the Blood, as much as may be, from the Part affected,

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and ſo preventing its being over-charg'd with it; and, at the ſame Time, giving Aſſiſtance to the Veſſels to recover their contractile Power, by which Means, the Circulation may be reſtor'd, and duly carried on: In this, I ſay, conſiſts the chief Skill of a Phyſician, as often as he directs *Blood-Letting* on Account of a Diſorder in any particular Part.

From hence we may eaſily learn in what Caſes bleeding in the Arm is uſeful, and preferable to bleeding in any other Part.

Firſt, Bleeding in one of the Arms may very properly be uſed, and will be very effectual, as often as there is any Wound, inflammatory Tumor, or Inflammation in any Part of the other Arm, Hand, or Side of the Breaſt; becauſe all thoſe Parts receive their Supply of Blood from

ſome

ſome Branch or other of the *Subclavian* Artery, and will all of them receive leſs than their uſual Quantity during the Time of *Blood-Letting*, by Reaſon of the *Derivation* into the *Subclavian* of that Arm where the Vein is open'd.

Secondly, Bleeding in the Arm is preferable to bleeding in any other Part, as often as there is an Inflamation of the *Pleura*, of the internal, or of the external *Intercoſtal* Muſcles, when the Seat of the Diſorder is as low or lower than the fifth Rib, becauſe the right inferior *Intercoſtal* Arteries which carry Blood to thoſe Parts, ariſe from the Trunk of the great Artery, and therefore bleeding in the Arm will cauſe a *Revulſion* with Reſpect to them.

Thirdly, Bleeding in the Arm is preferable to bleeding in any other Part, in all inflammatory Disorders of the secret Parts in either Sex, as likewise in all Inflammations of the Bladder, Ureters, or Kidneys, and in all immoderate Fluxes of Blood from the *Hæmorrhoidal* or *Uterine* Vessels; because by determining the Course of the Blood another Way, it will occasion such a *Revulsion* with Respect to those Parts, as will be very advantageous and effectual.

Fourthly, Bleeding in the Arm is preferable to bleeding in any other Part, as often as the Stomach, Liver, Spleen, or any of the *Viscera* of the lower Belly are over charged with Blood, actually inflamed, obstructed, or in danger of being so, because all those Parts being supply'd with Blood by Arteries that arise from the de-

scending

ſcending Trunk of the *Aorta*, the increaſing the Quantity of Blood which will flow into all the Branches of the *Subclavian* Artery, by opening a Vein in the Arm, will leſſen the Quantity that would otherwiſe have fallen upon thoſe lower Parts; by which Means their Veſſels being leſs diſtended, will be abler to recover their Tone, remove the Obſtruction, and ſo continue on the Blood's Circulation in a due and regular Manner.

Fifthly, and *laſtly*, Bleeding in the Arm is preferable to bleeding in any other Part, in all Wounds, Bruiſes, *Eryſipelatous* Tumors, or Inflammations of the Feet, Legs, Thighs, or any other Part that receives Blood from Arteries that proceed either immediately or mediately from

from the descending Trunk of the *Aorta*, because to the Benefit of *Evacuation* it joins that of *Revulsion*, which is so highly useful in all such Cases.

CHAP.

CHAP. VIII.

Of Bleeding in the FOOT; *when improper, and in what Cases preferable to Bleeding in any other Part.*

THOUGH Bleeding in the Foot be not so frequently practis'd in *England*, as in *France*, nor, perhaps, in several Cases wherein it ought to be, yet, whenever it is, the Trunk of the *Saphæna* near the internal Ankle, or else some Branch of it, which appears fairest upon the Instep, or upper Part of the Foot, is generally, if not always, open'd. The two Bones of the Leg, and

and the *Tendo Achillis*, forming a kind of Triangle, render it impoſſible to make a cloſe and ſtrait Ligature above the Part; and therefore after the Vein is prick'd, 'tis neceſſary to put the Foot into warm Water; by which Means, as much Blood as is required may be eaſily taken away.

As there is no Tendon, nor any conſiderable Artery near that Part of the *Saphæna* which is uſually prick'd, there cannot be the leaſt Danger of any of thoſe unhappy Accidents which too often happen from bleeding in the Arm; and this ought in Reaſon to give it the Preference in all Caſes, where bleeding in another Part is not particularly indicated: But as bleeding in the Foot is attended with a little more Trouble, than bleeding in the Arm, and moreover requires that the Patient ſhould keep the Part at reſt as much as

may

may be, and forbear walking for ſome Time after; for theſe Reaſons, I conceive, in all ordinary Caſes, or where an Evacuation only is intended, bleeding in the Foot is not commonly directed.

The neceſſary Conſequence of opening the *Saphæna*, according to what is before laid down, muſt be an Increaſe of the Blood's Motion, during the Time of *Blood-Letting*, in the Artery which anſwers to that Vein, as well as in all the intermediate Arteries which reach from the Heart to it, that is to ſay, in the deſcending Trunk of the *Aorta*, and according to which of the Feet is prick'd, in the *Iliac*, *Crural*, and *Tibial* Arteries on that Side, with the Ramifications of which laſt the *Saphæna* communicates, and is by them ſupplied with Blood. Upon this Account, there will be a *direct* Deriva-

tion of a greater Quantity of Blood into all the Arteries above mentioned, and a *collateral* one into all the Branches that arise from them in their Descent, that is to say, into the *Intercostal*, *Diaphragmatic*, *Cœliac*, *Mesenteric*, *Emulgent*, and *Hypogastric* Arteries, as likewise into the *Iliac* Artery of the opposite Side.

For this Reason, Bleeding in the Foot is forbidden in all Tumors or Inflammations of the Feet, Legs, or Thighs, in all Obstructions of the *Viscera* of the lower Belly, in all Disorders of the lower Part of the Breast from the fourth Rib downward: In a Word, in all Cases, where the Part affected receives its Blood from the descending Trunk of the *Aorta*, or from any Artery that proceeds from it. But to be more particular:

First,

First, It is improper to bleed in the Foot whenever the Midriff, or any Part of the eight lower Ribs is particularly affected; because the former is supply'd with Blood by the *Diaphragmatic*, and the latter by the *Intercostal* Arteries.

Secondly, It is not proper to bleed in the Foot in any Disorder of the Stomach, Liver, or Spleen, because they all three receive Blood from Branches of the *Cœliac* Artery.

Thirdly, It is no less ill-judg'd to bleed in the Foot, whenever there is any Obstruction or Inflammation in the Mesentery, Intestines, or Kidneys; because the two former are furnish'd with Blood by the *Mesenteric*, and the latter by the *Emulgent* Arteries.

Fourthly, Bleeding in the Foot is highly improper in any Vomiting of Blood, or violent and immoderate Flux of the *Menses* or *Hæmorrhoids*; and generally in all *Hæmorrhages* from any Part to which Blood is brought by Branches that proceed from the descending Trunk of the great Artery.

As therefore bleeding in the Foot is judg'd hurtful in all the foremention'd Cases, by reason of the *Derivation* it causes into the inferior Parts of the Body, so must it needs be highly useful by the *Revulsion* it always occasions at the same Time, with respect to the superior Parts of it.

First, Then bleeding in the Foot is preferable to bleeding in any other Part, whenever the *Cranium* happens

to

to be fractur'd, or there is any Wound, Tumor, or Inflammation of the *Pericranium.*

Secondly, In all *Opthalmias*, or Inflammations of the Eyes, in all violent Bleedings at the Nose, in an immoderate Flux of Blood from the Gums or Mouth, and in an *Erysipelas* of the Face, bleeding in the Foot is preferable to bleeding in any other Part.

Thirdly, In all excessive Pains of the Head, in Vertigos, Apoplexies, Convulsions, Lethargies, Quincies, and even in Pleurisies, where the Seat of the Disorder is higher than the fifth Rib, reckoning from above downward, bleeding in the Foot will always claim the Preference to bleeeding in any other Part.

Fourthly,

Fourthly, Bleeding in the Foot is preferable to bleeding in any other Part, in all Wounds, Tumors, or Inflammations of either of the Hands, Arms, Shoulders, or of the Neck, Breast, or any other Part of the Body whatever, to which Blood is convey'd by the left *Carotid*, or either of the *Subclavian* Arteries, or by any particular Branches that arise immediately, or any way proceed from them.

Fifthly, In all continual Fevers, as often as bleeding is indicated, and particularly at the Beginning, in order to prevent any Stagnation of the Blood, Rupture of the Vessels, or Inflammation of the Brain, bleeding in the Foot is highly preferable to bleeding in the Arm, or in any other Part whatever.

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In an ardent Fever, the Blood is ſo much rareſied, and its Motion ſo much increas'd, that there is Danger of an Inflammation or Rupture of the Capillary Veſſels all over the Body; but there will always be the greateſt Danger in that Part which is leaſt able to reſiſt, and that I humbly conceive is the Brain. For, not to mention its Situation ſo near the Heart, nor the great Quantity of Blood that is conſtantly carried into it, in Compariſon to other Parts, the Subſtance of it is ſo ſoft and yielding, its Veſſels are ſo ſmall, and their Coats ſo thin and weak, that it muſt needs ſuffer more, and ſooner than any other Part of the Body from a Rarefaction of the Blood, or an increaſed Impetuoſity of its Motion. All the Symptoms that happen in Fevers, are ſo many

Proofs

Proofs of this Truth. Sometimes an obſtinate Wakefulneſs, at other Times a conſtant Drowſineſs, a violent Pain in the Head, *Deliria*, Ravings, *&c.* Theſe all plainly ſhew how much the Brain ſuffers on ſuch Occaſions.

In Fevers of the ſlow and malignant Kind, though the Secretions are often very little alter'd, the Pulſe and Urine, in a manner, the ſame as in a State of Health, and there be no conſiderable Increaſe of Heat in the Body; yet, I believe, it is generally allow'd, that the Veſſels of the Brain are always overcharg'd with Blood at ſuch Times, and that the Brain itſelf is very often actually inflam'd.

During the Fever that precedes, and often attends the Eruption of the Small-Pox, the Brain is conſtantly expoſed to great Danger: For,

For, not to mention that ſuch Fevers are generally very violent, when the Puſtules begin to grow large, they ſo ſwell and diſtend the external Parts of the Body, as to hinder the Blood from circulating there after its uſual Manner. By which Means the Veſſels, which ſupply the ſeveral *Viſcera*, and internal Parts of it, will be overcharg'd with Blood, from whence probably Stagnations and dangerous Extravaſations may ariſe; and ſuch Parts will always be in moſt Danger, whoſe Subſtance is ſofteſt, and leaſt able to reſiſt the Dilatation of the Veſſels. But the greateſt and moſt immediate Danger, with which the Brain ſeems to be threatened in this Diſtemper, proceeds from the Difficulty of the Blood's Circulation in the external Parts of the Head. In this Diſtemper,

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there are always more Puſtules in the Face than in any other Part of the Body, of the ſame Dimenſions, eſpecially if they are *confluent* there; which very often happens. So great a Quantity of Puſtules, by ſwelling and ſtretching the Skin, muſt needs ſtraiten and hinder the due Courſe and Diſtribution of the Blood in the external Parts of the Head, and by that Means force it back upon the Brain.

If any Perſon deſires farther Proof of the great Danger to which the Brain is expoſed in Fevers, I refer him to ocular Demonſtration; that is, to the anatomical Diſſection of the Heads of ſuch as have died of them; which will ſhew, beyond Contradiction, that the Brain is the Part which ſuffers firſt and principally in all ſuch Caſes So that, I believe, I may ſafely affirm, that

no one ever yet died of a Fever, whoſe Brain remain'd ſafe and untouch'd.

'Tis therefore the Duty of every prudent and honeſt Phyſician, who has a real Regard for the Life of his Patient, to provide betimes, in all Fevers, for the Security of a Part ſo noble, and ſo liable to be expos'd; and where a ſmall Neglect often proves fatal and irretrievable. And the beſt Way of doing this, is, by ordering Blood to be taken away early from the Foot, and to be repeated as often as Occaſion ſhall require. This is the moſt effectual Method to preſerve the Brain from Danger, as well as to relieve it in Extremity; which, to the Benefit of Evacuation, adds likewiſe that of Revulſion. It need not, I preſume, be here ſaid, that the Practice of bleeding in the Foot in Fevers is

equally, not to ſay more neceſſary in Children than in grown Perſons; ſince the Brain and Blood-Veſſels of the former are more eaſily injur'd by the violent Attacks of the Blood, than thoſe of the latter. In ſhort, bleeding in the Foot, in all the forementioned Caſes, particularly in Fevers, is ſo highly beneficial for Infants, as well as Adults, and I have ſeen ſuch ſurpriſing Effects from it, both in *England* and other Parts of *Europe*, that for the Good of Mankind I heartily wiſh to ſee it more univerſally practis'd here. The Reaſonableneſs of it is plain and inconteſtable, ſince 'tis built upon the Situation and Diviſion of the Branches of the *Aorta*, and the unalterable Laws of Motion in Fluids; and therefore, though in ſuch a Caſe, all Authorities are needleſs,

yet

yet I shall here cite one, I mean that of the Learned and Ingenious Doctor APPERLEY, in his *Observations in Physick, both Rational and Practical*, p. 156. "'Tis observ'd, says he, "that in Apoplexies, Deliria, Con-"vulsions, Lethargies, malignant "Fevers, Small-Pox, violent Head-"Achs, in short, in all Distempers, "wherein there is Reason to appre-"hend an Inflammation or Ob-"struction in the Vessels of the "Brain, Head, Neck, Arms, *&c.* "Bleeding in the Foot gives more "Relief than any other." And in his *Treatise on the Small-Pox*, to which he has annexed several *Aphorisms*, this is the last of them, with which I shall conclude.

"When Bleeding is indicated, "the Bleeding in the Foot is pre-"ferable to any other: For the

"lower

" lower Veſſels being emptied, the
" Blood iſſuing from the Heart will
" meet with leſs Reſiſtance in the
" deſcending Trunk of the *Aorta*:
" It will be determin'd to flow that
" Way in a greater Quantity; ſo
" that the Veſſels of the Head,
" which, in this Diſtemper, are the
" moſt ſubject to be inflam'd, will
" receive much leſs of it, and may,
" therefore, be able to recover their
" Elaſtic Tone."

ERRATA.

P. 79. l. 1. for *are* read *is*. P. 96. l. 5. for *arrive* r. *ariſe*.

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